

# Using XHTML in XSD Annotations (RTF demo)

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# Schema "HumanEvolution.xsd"

**Schema Source:**

C:\docflex-xml\samples\HumanEvolution\HumanEvolution.xsd; see [XML source](#) [44]

**Target Namespace:**

<http://www.geocities.com/palaeoanthropology>

**Defined Components:**

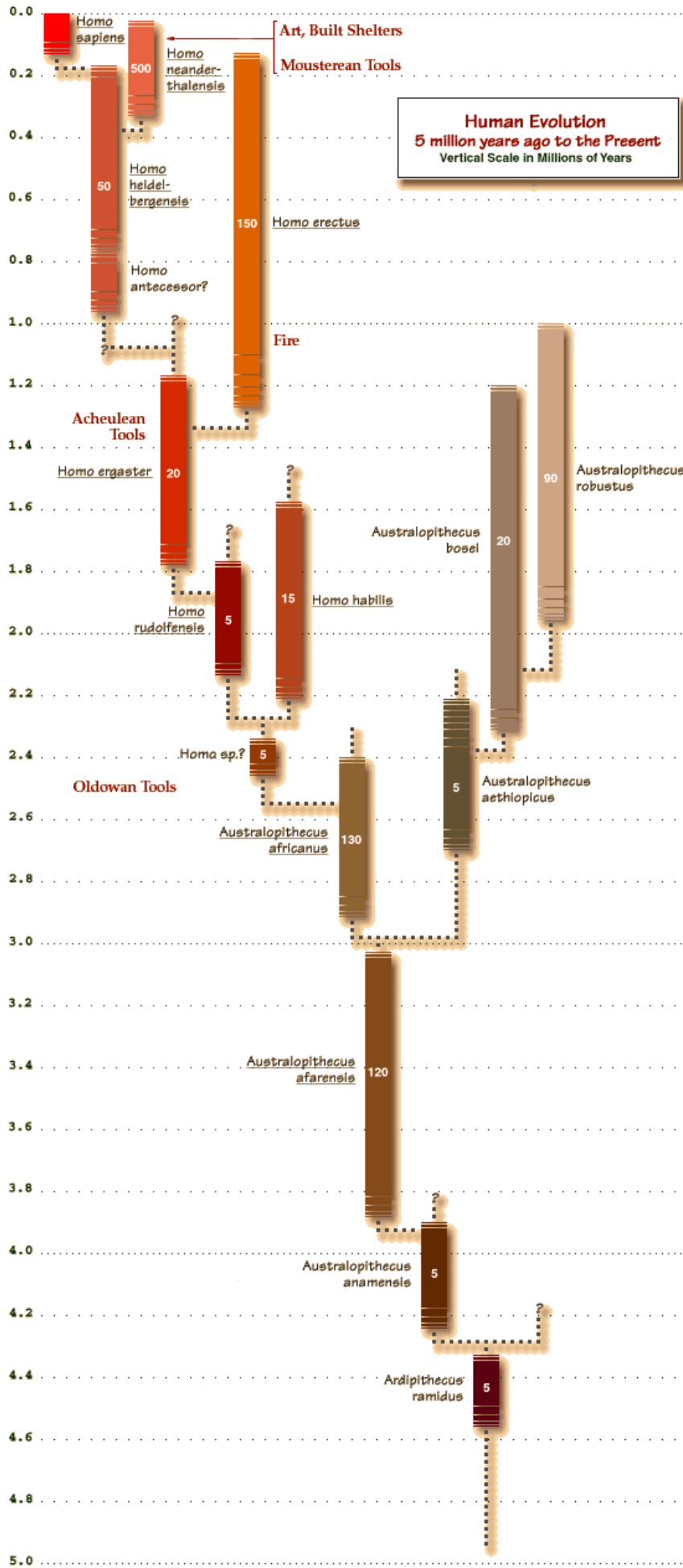
[complexType](#) (13)

**Default Namespace-Qualified Form:**




Local Elements: unqualified; Local Attributes: unqualified

## Annotation

*Notice: All scientific texts and most of the images presented here were borrowed from the following website:*  
<http://www.geocities.com/palaeoanthropology/>. FILIGRIS WORKS respects and appreciates the work of the site author.



Complex Type Summary		Page
 <b>ArdipithecusRamidus</b>	<p><i>Ardipithecus ramidus</i> is the earliest hominid found so far and was discovered in <a href="#">Aramis</a>, in the Middle Awash region of Ethiopia in 1994 by Tim White and his two colleagues, Gen Suwa and Berhane Asfaw.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [6]  <b>Includes:</b> definitions of 7 <a href="#">attributes</a>  <b>Used:</b> at 1 <a href="#">location</a></p>	6
 <b>AustralopithecusAethiopicus</b>	<p>In 1985, a cranium was found by Alan Walker at the west side of <a href="#">Lake Turkana in Northern Kenya</a> and was named <i>Australopithecus aethiopicus</i>.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [9]  <b>Used:</b> at 1 <a href="#">location</a></p>	9
 <b>AustralopithecusAfarensis</b>	<p>Until recently, the earliest known hominine for which sufficient diagnostic anatomical evidence was available was <i>Australopithecus afarensis</i>, fossils of which have been found in <a href="#">Ethiopia, Tanzania, and Kenya</a>, and most of which date between 2.9 and 3.9 million years.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [12]  <b>Used:</b> at 2 <a href="#">locations</a></p>	11
 <b>AustralopithecusAfricanus</b>	<p>An Australian anatomist at the University of the Witwatersrand, Johannesburg, South Africa, named <a href="#">Raymond Dart</a>, discovered the first australopithecine in November 1924 and published his interpretation of it in the journal <i>Nature</i> in February 1925.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [15]  <b>Used:</b> at 2 <a href="#">locations</a></p>	14
 <b>AustralopithecusAnamensis</b>	<p>This hominine species was discovered in 1994 by <a href="#">Maeve Leakey</a> in <a href="#">Kanapoi and Allia Bay</a>, situated in North Kenya.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [17]  <b>Used:</b> at 1 <a href="#">location</a></p>	17
 <b>AustralopithecusBoisei</b>	<p>In 1959, <a href="#">Mary Leakey</a> made the first hominine discovery in East Africa at the <a href="#">Olduvai Gorge in Tanzania</a> which resembled the robust australopithecines already found in South Africa.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [21]  <b>Used:</b> never</p>	20
 <b>HomoErectus</b>	<p>The first findings of <i>Homo erectus</i> fossils were made in the late 19th and early 20th century in <a href="#">Indonesia and China</a>.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [24]  <b>Used:</b> never</p>	23
 <b>HomoErgaster</b>	<p>One of the most famous finds at <a href="#">Lake Turkana, Northern Kenya</a>, is the cranium of an early species of <i>Homo</i>, known as <i>Australopithecus boisei</i>.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [27]  <b>Used:</b> at 2 <a href="#">locations</a></p>	26
 <b>HomoHabilis</b>	<p>The early discoveries of early hominid fossils were made at <a href="#">Olduvai Gorge</a>, by the <a href="#">Leakeys</a>.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [30]  <b>Used:</b> never</p>	29
 <b>HomoHeidelbergensis</b>	<p>This species is often also referred to as "<i>Archaic Homo Sapiens</i>".</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [33]  <b>Used:</b> at 2 <a href="#">locations</a></p>	32

 <b>HomoNeandertalensis</b>	<p>Neanderthals lived roughly 150,000 to 30,000 years ago and lived in much of <a href="#">Europe, part of Asia, and the Middle East</a>.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [36]  <b>Used:</b> never</p>	35
 <b>HomoRudolfensis</b>	<p>In October 1993, an international team of paleontologists discovered a partial hominine mandible near <a href="#">Lake Malawi</a>.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [39]  <b>Used:</b> at 1 <a href="#">location</a></p>	38
 <b>HomoSapiens</b>	<p>Population movements such as the colonisation of the Americas have occurred many times in human prehistory, and they inevitably muddy what might otherwise be a clear relationship between body shape and climate, and its change through time.</p> <p><b>Content:</b> empty, 7 <a href="#">attributes</a>  <b>Defined:</b> globally; see <a href="#">XML source</a> [42]  <b>Used:</b> never</p>	41

## Complex Types

complexType

# ArdipithecusRamidus

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [6]  
**Includes:** definitions of 7 [attributes](#)  
**Used:** at 1 [location](#)

### XML Representation Summary

```
<...
  height           = xs:decimal
  weight          = xs:decimal
  physique         = xs:string
  cranialVolume   = xs:integer
  knownDate       = xs:gYear
  distribution    = xs:string
  skullForm       = xs:string
/>
```

### Known Direct Subtypes (1):

[AustralopithecusAnamensis](#) [17]

### Known Indirect Subtypes (11):

[AustralopithecusAethiopicus](#) [9], [AustralopithecusAfarensis](#) [11], [AustralopithecusAfricanus](#) [14],  
[AustralopithecusBoisei](#) [20], [HomoErectus](#) [23], [HomoErgaster](#) [26], [HomoHabilis](#) [29], [HomoHeidelbergensis](#)  
[32], [HomoNeandertalensis](#) [35], [HomoRudolfensis](#) [38], [HomoSapiens](#) [41]

### Known Usage Locations

- In derivations of other global types (1):

[AustralopithecusAnamensis](#) [17] (as extension base)

### Annotation



*Ardipithecus ramidus* is the earliest hominid found so far and was discovered in [Aramis](#), in the Middle Awash region of Ethiopia in 1994 by Tim White and his two colleagues, Gen Suwa and Berhane Asfaw. *Ardipithecus ramidus* translates literally as "ground man-root" and is thought to be 4.4 to 4.5 million years old. Originally it was named as a member of the Australopithecine family, but it was later decided that this species differed too much from other australopithecines.

However, even though the possibility has been raised that *ramidus* might even be an ape, it is fairly sure that it is a hominid, as the very earliest hominines were expected to be apelike (or even possibly chimplike) in many ways such as dentition anyway. It has thus been decided that *Ardipithecus ramidus* was **not** a direct ancestor to later hominids.

### XML Source (w/o annotations (1); see within schema source: p. 44)

```
<xs:complexType name="ArdipithecusRamidus">
  <xs:attribute name="height" type="xs:decimal"/>
  <xs:attribute name="weight" type="xs:decimal"/>
  <xs:attribute name="physique" type="xs:string"/>
  <xs:attribute name="cranialVolume" type="xs:integer"/>
  <xs:attribute name="knownDate" type="xs:gYear"/>
```

```
<xs:attribute name="distribution" type="xs:string"/>
<xs:attribute name="skullForm" type="xs:string"/>
</xs:complexType>
```

## Attribute Detail (all declarations: 7/7)

### ■ cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally within [\(this\) ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

### ■ distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally within [\(this\) ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

### ■ height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally within [\(this\) ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

### ■ knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally within [\(this\) ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

### ■ physique

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally within [\(this\) ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

### ■ skullForm

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally within [\(this\) ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined

**Use:** optional

**Defined:** locally within ([this](#)) ArdipithecusRamidus complexType

XML Source ([see](#) within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```



complexType

# AustralopithecusAethiopicus

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [9]  
**Used:** at 1 [location](#)

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique          = xs:string
  cranialVolume     = xs:integer
  knownDate         = xs:gYear
  distribution      = xs:string
  skullForm         = xs:string
/>
```

## Known Direct Subtypes (1):

[AustralopithecusBoisei](#) [20]

## Known Usage Locations

- In derivations of other global types (1):

[AustralopithecusBoisei](#) [20] (as extension base)

## Annotation

In 1985, a cranium was found by Alan Walker at the west side of [Lake Turkana in Northern Kenya](#) and was named *Australopithecus aethiopicus*. The cranium was as robust as any yet known, but was 2.5 million years old. Clearly, the huge molars, flared cheek bones, and dished face could not be the end-product of an evolutionary line if it were present at the origin of that supposed line. How this discovery affects the shape of the hominid family tree remains under discussion today.

## Type Definition Detail

### Type Derivation Tree

```
ArdipithecusRamidus [6] (extension)
├─ AustralopithecusAnamensis [17] (extension)
│   └─ AustralopithecusAfarensis [11] (extension)
│       └─ AustralopithecusAethiopicus
```

## XML Source (w/o annotations (1); see within schema source: p. 46)

```
<xs:complexType name="AustralopithecusAethiopicus">
  <xs:complexContent>
    <xs:extension base="AustralopithecusAfarensis"/>
  </xs:complexContent>
</xs:complexType>
```

## Attribute Detail (all declarations; 7/7)

■ [cranialVolume](#)

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

■ distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

■ height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

■ knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [8] within [ArdipithecusRamidus](#) complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

complexType

# AustralopithecusAfarensis

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [12]  
**Used:** at 2 [locations](#)

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm        = xs:string
/>
```

## Known Direct Subtypes (2):

[AustralopithecusAethiopicus](#) [9], [AustralopithecusAfricanus](#) [14]

## Known Indirect Subtypes (8):

[AustralopithecusBoisei](#) [20], [HomoErectus](#) [23], [HomoErgaster](#) [26], [HomoHabilis](#) [29], [HomoHeidelbergensis](#) [32], [HomoNeandertalensis](#) [35], [HomoRudolfensis](#) [38], [HomoSapiens](#) [41]

## Known Usage Locations

- In derivations of other global types (2):

[AustralopithecusAethiopicus](#) [9] (as extension base),  
[AustralopithecusAfricanus](#) [14] (as extension base)

## Annotation



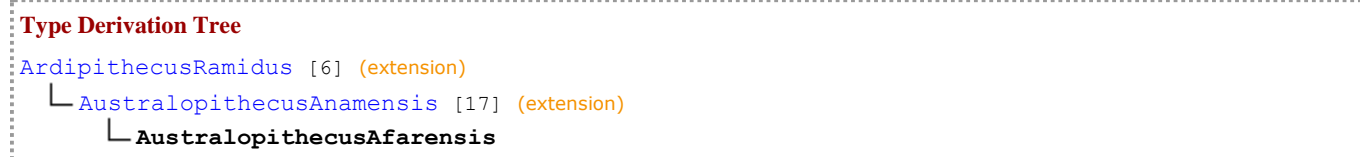
Until recently, the earliest known hominine for which sufficient diagnostic anatomical evidence was available was *Australopithecus afarensis*, fossils of which have been found in [Ethiopia](#), [Tanzania](#), and [Kenya](#), and most of which date between 2.9 and 3.9 million years. New finds of fossils as old or older than *A. afarensis* have been made in Ethiopia, Kenya, and Chad. These specimens, which are sufficiently different from *A. afarensis* to have been named a new species, include the following: [Ardipithecus ramidus](#) from Ethiopia, dated at 4.4 million years; [Australopithecus anamensis](#) from Kenya, with an age range of 4.2 to 3.9 million years; and [Australopithecus bahrelghazali](#) from Chad, with an age estimate of 3 to 3.5 million years.

The first *afarensis* fossils were found in the mid 1970s. Their initial interpretation was controversial and remains so today, albeit to a lesser degree. While many anthropologists accept that the multitude of fossil specimens that have been attributed to *afarensis* do indeed represent a single, sexually dimorphic species, others believe that the fossils belong to two, and perhaps more, species. For a long time *afarensis* was assumed to have represented the founding species of the hominine clade and the ancestor of all later species.

<u>Height</u>	1.0 – 1.5 metres
<u>Weight</u>	30 – 70 kg
<u>Cranial Volume</u>	400 – 500 cm <sup>3</sup>
<u>Known Date</u>	4.0 – 2.5 million years ago
<u>Distribution</u>	Eastern Africa

<u>Physique</u>	Light build; some ape-like features
<u>Skull form</u>	Low, flat forehead; projecting face; prominent brow ridges
<u>Jaws/Teeth</u>	Relatively large incisors and canines; gap between upper incisors and canines; moderate-sized molars
<u>Sexual Dimorphism</u>	Marked to moderate

## Type Definition Detail



## XML Source (w/o annotations (1); see within schema source: p. 45)

```

<xs:complexType name="AustralopithecusAfarensis">
  <xs:complexContent>
    <xs:extension base="AustralopithecusAnamensis"/>
  </xs:complexContent>
</xs:complexType>
    
```

## Attribute Detail (all declarations; 7/7)

■ cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="cranialVolume" type="xs:integer"/>
    
```

■ distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="distribution" type="xs:string"/>
    
```

■ height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="height" type="xs:decimal"/>
    
```

■ knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined

**Use:** optional

**Defined:** locally [8] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

complexType

# AustralopithecusAfricanus

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [15]  
**Used:** at 2 [locations](#)

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm        = xs:string
/>
```

## Known Direct Subtypes (2):

[HomoHabilis](#) [29], [HomoRudolfensis](#) [38]

## Known Indirect Subtypes (5):

[HomoErectus](#) [23], [HomoErgaster](#) [26], [HomoHeidelbergensis](#) [32], [HomoNeandertalensis](#) [35], [HomoSapiens](#) [41]

## Known Usage Locations

- In derivations of other global types (2):

[HomoHabilis](#) [29] (as extension base), [HomoRudolfensis](#) [38] (as extension base)

## Annotation



An Australian anatomist at the University of the Witwatersrand, Johannesburg, South Africa, named [Raymond Dart](#), discovered the first australopithecine in November 1924 and published his interpretation of it in the journal *Nature* in February 1925. The fossil was that of an immature apelike individual and was found at a lime quarry at [Taung](#), southwest of Johannesburg. The fossil existed of the face, part of the cranium, the complete lower jaw and a brain endocast, formed when sand inside the skull hardened to rock, recording the shape of the brain.

In the *Nature* paper published by Dart, he stated that the Taung individual was an earlier form of human, and named it *Australopithecus africanus* ("southern ape from Africa"). When a Scottish paleontologist named Robert Broom, joined in the search for early hominid fossils with Dart, they soon discovered other examples of australopithecine. *Australopithecus africanus* appeared to be apelike in having a protruding face and small brain, but had distinctly unapelike dentition, including small canines and large, flat molars. A bipedal posture was again indicated by the central position of the foramen magnum, and by the anatomy of the spine, pelvis, and femur.

<u>Height</u>	1.1 – 1.4 metres
<u>Weight</u>	30 – 60 kg
<u>Cranial Volume</u>	400 – 500 cm <sup>3</sup>
<u>Known Date</u>	3.0 – 2.5 million years ago
<u>Distribution</u>	Southern Africa
<u>Physique</u>	Light build; probably relatively long arms; more "human" features

<u>Skull form</u>	Higher forehead; shorter face; brow ridges less prominent
<u>Jaws/Teeth</u>	Small incisor-like canines; no gap between upper incisors and canines; larger molars
<u>Sexual Dimorphism</u>	Probably less than <i>A. afarensis</i>

## Type Definition Detail



## XML Source (w/o annotations (1); see within schema source: p. 48)

```

<xs:complexType name="AustralopithecusAfricanus">
  <xs:complexContent>
    <xs:extension base="AustralopithecusAfarensis"/>
  </xs:complexContent>
</xs:complexType>
    
```

## Attribute Detail (all declarations; 7/7)

cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="cranialVolume" type="xs:integer"/>
    
```

distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="distribution" type="xs:string"/>
    
```

height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="height" type="xs:decimal"/>
    
```

knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="knownDate" type="xs:gYear"/>
    
```

■ physique

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [8] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```



complexType

# AustralopithecusAnamensis

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [17]  
**Used:** at 1 [location](#)

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate       = xs:gYear
  distribution    = xs:string
  skullForm       = xs:string
/>
```

## Known Direct Subtypes (1):

[AustralopithecusAfarensis](#) [11]

## Known Indirect Subtypes (10):

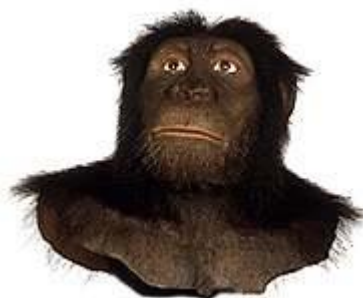
[AustralopithecusAethiopicus](#) [9], [AustralopithecusAfricanus](#) [14], [AustralopithecusBoisei](#) [20], [HomoErectus](#) [23], [HomoErgaster](#) [26], [HomoHabilis](#) [29], [HomoHeidelbergensis](#) [32], [HomoNeandertalensis](#) [35], [HomoRudolfensis](#) [38], [HomoSapiens](#) [41]

## Known Usage Locations

- In derivations of other global types (1):

[AustralopithecusAfarensis](#) [11] (as extension base)

## Annotation



This hominine species was discovered in 1994 by [Maeve Leakey](#) in [Kanapoi and Allia Bay](#), situated in North Kenya. It was named *Australopithecus anamensis* from "anam" meaning "lake" in the local Turkana language. The fossils (9 from Kanapoi and 12 from Allia Bay) include upper and lower jaws, cranial fragments, and the upper and lower parts of a leg bone (tibia). In addition to this, the collection includes a fragment of humerus that was found 30 years ago at the same site at Kanapoi.

It was found along the East African Rift valley and due to the dating of this hominine species, *Australopithecus anamensis* could possibly be an ancestor to "Lucy" and counterparts.

## Type Definition Detail

### Type Derivation Tree

```
ArdipithecusRamidus [6] (extension)
└─ AustralopithecusAnamensis
```

## XML Source (w/o annotations (1); see within schema source: p. 45)

```
<xs:complexType name="AustralopithecusAnamensis">
  <xs:complexContent>
    <xs:extension base="ArdipithecusRamidus"/>
  </xs:complexContent>
</xs:complexType>
```

**Attribute Detail** (all declarations; 7/7)

## ■ cranialVolume

**Type:** `xs:integer`, predefined  
**Use:** optional  
**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

## ■ distribution

**Type:** `xs:string`, predefined  
**Use:** optional  
**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

## ■ height

**Type:** `xs:decimal`, predefined  
**Use:** optional  
**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

## ■ knownDate

**Type:** `xs:gYear`, predefined  
**Use:** optional  
**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

## ■ physique

**Type:** `xs:string`, predefined  
**Use:** optional  
**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

## ■ skullForm

**Type:** `xs:string`, predefined  
**Use:** optional  
**Defined:** locally [7] within `ArdipithecusRamidus` complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

## ■ weight

**Type:** `xs:decimal`, predefined  
**Use:** optional

**Defined:** [locally](#) [8] within [ArdipithecusRamidus](#) complexType

XML Source ([see](#) within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

complexType

# AustralopithecusBoisei

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 attributes  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [21]  
**Used:** never

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm        = xs:string
/>
```

## Annotation



In 1959, [Mary Leakey](#) made the first hominine discovery in East Africa at the [Olduvai Gorge in Tanzania](#) which resembled the robust australopithecines already found in South Africa. After reconstructing the skull which was built up out of hundreds of fragments, it was found that this specimen was even more "robust" than its southern relatives. At first, it was named *Zinjanthropus boisei*, but later changed to *Australopithecus boisei*. There is still however a lively debate over the genus name and this species is also often referred to as *Paranthropus boisei*. A common perception is that the robust species of australopithecine differs sufficiently from the gracile type to warrant a different genus name.

<u>Height</u>	1.2 – 1.4 metres
<u>Weight</u>	40 – 80 kg
<u>Cranial Volume</u>	410 – 530 cm <sup>3</sup>
<u>Known Date</u>	2.6 – 1.2 million years ago
<u>Distribution</u>	Eastern Africa
<u>Physique</u>	Very heavy build; relatively long arms
<u>Skull form</u>	Prominent crests on top and back of skull; very long, broad, flattish face; strong facial buttressing
<u>Jaws/Teeth</u>	Very thick jaws; small incisors and canines; large, molar-like premolars; very large molars
<u>Sexual Dimorphism</u>	Marked sexual dimorphism

## Type Definition Detail

### Type Derivation Tree

```

ArdipithecusRamidus [6] (extension)
├─ AustralopithecusAnamensis [17] (extension)
│   └─ AustralopithecusAfarensis [11] (extension)
│       └─ AustralopithecusAethiopicus [9] (extension)
│           └─ AustralopithecusBoisei
    
```

### XML Source (w/o annotations (1); see within schema source: p. 47)

```

<xs:complexType name="AustralopithecusBoisei">
  <xs:complexContent>
    <xs:extension base="AustralopithecusAethiopicus" />
  </xs:complexContent>
</xs:complexType>
    
```

### Attribute Detail (all declarations; 7/7)

#### cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

#### distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

#### height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

#### knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

#### physique

**Type:** xs:string, predefined  
**Use:** optional

**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

**XML Source** ([see](#) within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

**XML Source** ([see](#) within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined

**Use:** optional

**Defined:** locally [8] within [ArdipithecusRamidus](#) complexType

**XML Source** ([see](#) within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

## complexType HomoErectus

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [24]  
**Used:** never

### XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm        = xs:string
/>
```

### Annotation



The first findings of *Homo erectus* fossils were made in the late 19th and early 20th century in [Indonesia and China](#). At first, these findings were not recognised as early hominids, but with later studies it was finally accepted that *Homo erectus* was a widespread early human species.

Since the 1950s, discoveries of *Homo erectus* fossils have been made sporadically, principally in [Africa, but also in Asia](#). The first of these discoveries took place in Algeria, where three jaws, a cranial bone, and some teeth were found. Several specimens of *Homo erectus* were also found at [Olduvai Gorge](#), in East Africa, including a rather robustly built, large-brained cranium. Findings were also made in South Africa.

However, the richest source of fossils has been the Lake Turkana region of northern Kenya, both on the east and west sides. These sites have exposed the oldest and most complete specimens. In 1975, an almost complete cranium was found and then dated at 1.8 million years with a brain size of 880 cm<sup>3</sup>. A decade later, they found the now famous "Turkana Boy" which is renowned for its almost complete skeleton. This skeleton was a huge aid in assessing overall body proportions and relationships of the species. This boy stood more than 5 feet tall when he died, and would have exceeded 6 feet – had he lived to maturity. His cranial capacity was 880 cm<sup>3</sup> and his body stature (tall, thin, long arms and legs) are typical of humans adapted to open, tropical environments.

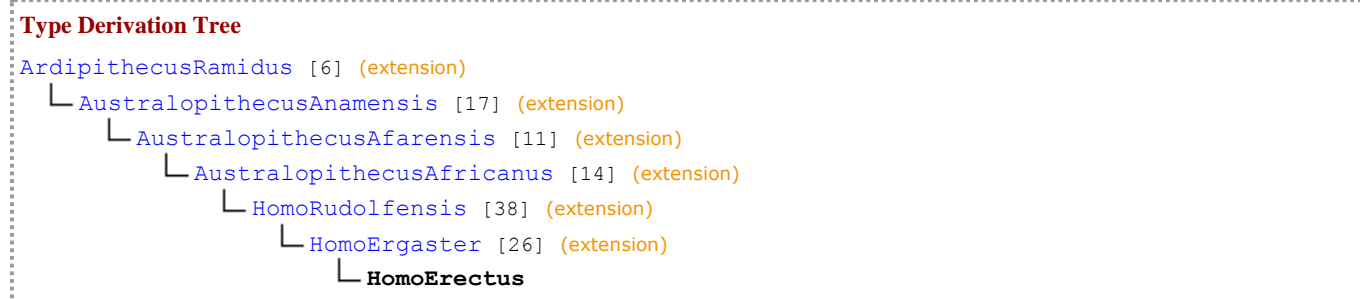
Two different hypotheses exist stating where *Homo erectus* first arose. The first model is called [The Multiregional Evolution Model](#) and used to be by far the most popular until recent genetic evidence was brought to light by a scientist at the University of California at Berkeley called Allan Wilson. This model believes that roughly 1 million years ago, *Homo erectus* expanded its range beyond Africa, first into Asia and then into Europe, developing geographically variable populations. *Homo erectus* then became the direct ancestor of *Homo sapiens* by a gradual worldwide (excluding the Americas and Australia) evolutionary transformation of all populations of *Homo erectus*.

The second hypothesis is referred to as the ["Out of Africa Model"](#) and believes that that it was not a gradual worldwide change that led to the evolutionary transformation of populations of *Homo erectus*, but a speciation event in a single population in Africa, which then spread throughout the Old World and replaced established populations. This hypothesis was brought forward by Allan Wilson who in 1987 proved with genetic evidence that all modern humans evolved from a single female who lived in Africa approximately 200,000 years ago. This is also known as the "Mitochondrial Eve Hypothesis".

<u>Height</u>	1.3 – 1.7 metres
<u>Physique</u>	Robust, but "human" skeleton
<u>Cranial Volume</u>	750 – 1250 cm <sup>3</sup>

<u>Known Date</u>	1.8 – 0.1 million years ago
<u>Distribution</u>	Africa, Asia and Indonesia (and Europe?)
<u>Skull form</u>	Flat, thick skull with large occipital and brow ridge
<u>Jaws/Teeth</u>	Robust jaw in larger individuals; smaller teeth than <i>H. habilis</i>

## Type Definition Detail



## XML Source (w/o annotations (1); see within schema source: p. 54)

```

<xs:complexType name="HomoErectus">
  <xs:complexContent>
    <xs:extension base="HomoErgaster"/>
  </xs:complexContent>
</xs:complexType>

```

## Attribute Detail (all declarations; 7/7)

■ cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="cranialVolume" type="xs:integer"/>

```

■ distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="distribution" type="xs:string"/>

```

■ height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="height" type="xs:decimal"/>

```

■ knownDate

**Type:** xs:gYear, predefined



**Use:** optional  
**Defined:** [locally](#) [7] within [ArdipithecusRamidus](#) complexType

XML Source ([see](#) within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ **physique**

**Type:** `xs:string`, predefined  
**Use:** optional  
**Defined:** [locally](#) [7] within [ArdipithecusRamidus](#) complexType

XML Source ([see](#) within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ **skullForm**

**Type:** `xs:string`, predefined  
**Use:** optional  
**Defined:** [locally](#) [7] within [ArdipithecusRamidus](#) complexType

XML Source ([see](#) within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ **weight**

**Type:** `xs:decimal`, predefined  
**Use:** optional  
**Defined:** [locally](#) [8] within [ArdipithecusRamidus](#) complexType

XML Source ([see](#) within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

## complexType

# HomoErgaster

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [27]  
**Used:** at 2 [locations](#)

### XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate       = xs:gYear
  distribution    = xs:string
  skullForm       = xs:string
/>
```

### Known Direct Subtypes (2):

[HomoErectus](#) [23], [HomoHeidelbergensis](#) [32]

### Known Indirect Subtypes (2):

[HomoNeandertalensis](#) [35], [HomoSapiens](#) [41]

### Known Usage Locations

- In derivations of other global types (2):

[HomoErectus](#) [23] (as extension base), [HomoHeidelbergensis](#) [32] (as extension base)

### Annotation



One of the most famous finds at [Lake Turkana, Northern Kenya](#), is the cranium of an early species of *Homo*, known as *Australopithecus boisei*. However, in the same sedimentary layer, another cranium was also found belonging to a species of hominid named *Homo ergaster*. This hominid species is believed to be a different geographical population of *Homo erectus*.

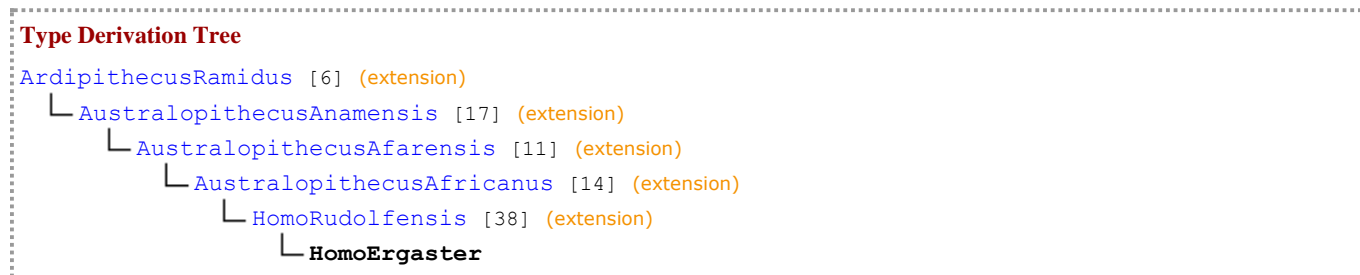
Many aspects of *Homo ergaster* and *Homo erectus* anatomy are, of course, similar, with the principal differences being a higher cranial vault, thinner cranial bone, absence of sagittal keel, and certain cranial base characteristics in *Homo ergaster*. One distinguishing feature between early *Homo* and *ergaster/erectus* involves increased brain size (ranging between 850 and 1100 cm<sup>3</sup>, with an increase over time), although the increase in body size actually means that the relative brain size has increased but little.

Other distinguishing features include a long, low cranium (particularly in *Homo erectus*), the presence of brow ridges, a shortened face, and a projecting nasal aperture, suggesting the first appearance of the typical human external nose with the nostrils facing downward. The structure of the nose would permit the condensation of moisture from exhaled air, which would have proved beneficial in a species that pursued an active subsistence strategy in warm, arid habitats, such as those occupied by early *Homo ergaster*.

Early *Homo* gave rise to a large-bodied, large-brained species in Africa approximately 2 million years ago, but this species is now called *Homo ergaster* by many anthropologists. *Homo ergaster* expanded its range beyond Africa and into Asia soon after its origin and at least by 1.8 million years ago; it then gave rise to *Homo erectus* in those areas. *Homo erectus* expanded its range throughout Asia, back into Africa, and presumably into Europe. Approximately 150,000 years ago, a speciation event in Africa gave rise to *Homo sapiens* (probably from *Homo ergaster*, but possibly from *Homo erectus*), which then spread into the rest of the Old World, and subsequently into Australia and the Americas.

<u>Height</u>	1.3 – 1.7 metres
<u>Physique</u>	Robust, but "human" skeleton
<u>Cranial Volume</u>	750 – 1250 cm <sup>3</sup>
<u>Known Date</u>	1.8 – 1.2 million years ago
<u>Distribution</u>	Africa into Asia
<u>Skull form</u>	Higher cranial vault, thinner cranial bone, absence of sagittal keel and certain cranial base characteristics
<u>Jaws/Teeth</u>	Robust jaw in larger individuals; smaller teeth than <i>H. habilis</i>

## Type Definition Detail



## XML Source (w/o annotations (1); see within schema source: p. 52)

```

<xs:complexType name="HomoErgaster">
  <xs:complexContent>
    <xs:extension base="HomoRudolfensis"/>
  </xs:complexContent>
</xs:complexType>

```

## Attribute Detail (all declarations; 7/7)

cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="cranialVolume" type="xs:integer"/>

```

distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="distribution" type="xs:string"/>

```

height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="height" type="xs:decimal"/>

```

■ knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [8] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

# complexType HomoHabilis

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 attributes  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [30]  
**Used:** never

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm       = xs:string
/>
```

## Annotation



Dart.

The early discoveries of early hominid fossils were made at [Olduvai Gorge](#), by the [Leakeys](#). Not long after [Mary Leakey](#) had found *Australopithecus boisei*, [Louis Leakey](#) found fossils which he thought were the makers of the stone tools found in the gorge. At first he had attributed *Australopithecus boisei* with the stone artifacts discovered in the gorge, but when the hominid fossils were finally found, he immediately realised that this was not the case.

The fossils were thought to be slightly older than *Australopithecus boisei* (about 1.75 million years) and in addition, the teeth were smaller and the brain was calculated to be significantly larger. Louis Leakey became convinced that these fossils were in fact the ancestors of modern humans. It was determined that *Homo habilis* (as the fossils were named) overlapped with the robust australopithecines for roughly 1 million years. *Homo habilis* means "handy man" and was suggested to them by Raymond

A series of anatomical characters is to be found uniquely in *Homo* – for example, an increase in cranial vault height and thickness, reduced lower facial prognathism, and reduction in the size of premolars and molars and the length of the molar row – but what has always stood out the most is brain size.

<u>Height</u>	1.0 metres
<u>Physique</u>	Relatively long arms
<u>Cranial Volume</u>	500 – 650 cm <sup>3</sup>
<u>Known Date</u>	2.0 – 1.6 million years ago
<u>Distribution</u>	Eastern (+Southern?) Africa
<u>Skull form</u>	Relatively small face; nose developed
<u>Jaws/Teeth</u>	Thinner jaw; smaller, narrow molars

## Type Definition Detail

### Type Derivation Tree

```

ArdipithecusRamidus [6] (extension)
├─ AustralopithecusAnamensis [17] (extension)
│   └─ AustralopithecusAfarensis [11] (extension)
│       └─ AustralopithecusAfricanus [14] (extension)
│           └─ HomoHabilis
    
```

### XML Source (w/o annotations (1); see within schema source: p. 51)

```

<xs:complexType name="HomoHabilis">
  <xs:complexContent>
    <xs:extension base="AustralopithecusAfricanus" />
  </xs:complexContent>
</xs:complexType>
    
```

### Attribute Detail (all declarations; 7/7)

#### cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

#### distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

#### height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

#### knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within [ArdipithecusRamidus](#) complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

#### physique

**Type:** xs:string, predefined  
**Use:** optional

**Defined:** [locally](#) [7] within [ArdipithecusRamidus](#) complexType

**XML Source** ([see](#) within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** `xs:string`, predefined

**Use:** optional

**Defined:** [locally](#) [7] within [ArdipithecusRamidus](#) complexType

**XML Source** ([see](#) within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** `xs:decimal`, predefined

**Use:** optional

**Defined:** [locally](#) [8] within [ArdipithecusRamidus](#) complexType

**XML Source** ([see](#) within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

# complexType HomoHeidelbergensis

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [33]  
**Used:** at 2 [locations](#)

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate       = xs:gYear
  distribution    = xs:string
  skullForm       = xs:string
/>
```

## Known Direct Subtypes (2):

[HomoNeandertalensis](#) [35], [HomoSapiens](#) [41]

## Known Usage Locations

- In derivations of other global types (2):

[HomoNeandertalensis](#) [35] (as extension base), [HomoSapiens](#) [41] (as extension base)

## Annotation



This species is often also referred to as "Archaic *Homo Sapiens*". Many examples of so-called Archaic *Homo sapiens* have been located, including some recent spectacular finds at [Atapuerca](#), in North East Spain. These remains of many individuals include some that may be 780,000 years old. According to some proponents of the "[Out of Africa](#)" hypothesis, most of these specimens should be assigned to *Homo heidelbergensis*, which may have been ancestral to Neanderthals in Europe and to [Homo sapiens](#) in Africa. However, in May 1997, the discoverers of the fossils elected to name the fossils a new species, *Homo antecessor*. [Multiregionalists](#) view this group as evidence of a transition toward modern *Homo sapiens*.

The "Mauer mandible", found in 1907 and dated at roughly 500,000 years old, combines primitive features (robusticity) with modern features (molar size), was given the species name *Homo heidelbergensis* in 1908. Some major findings of this species may be located at [Atapuerca](#) in Northern Spain where one of the most spectacular findings of recent times was made. They uncovered 1300 human fossils remains (representing 30 individuals) dated at 300,000 years old. These specimens also display modern and ancient features mixed, and can probably be assigned to *Homo heidelbergensis*.

The main noticeable features of the fossils is the more prominent face and nose and the changes at the base of the skull which are perhaps thought to be associated with changes in the voice box.

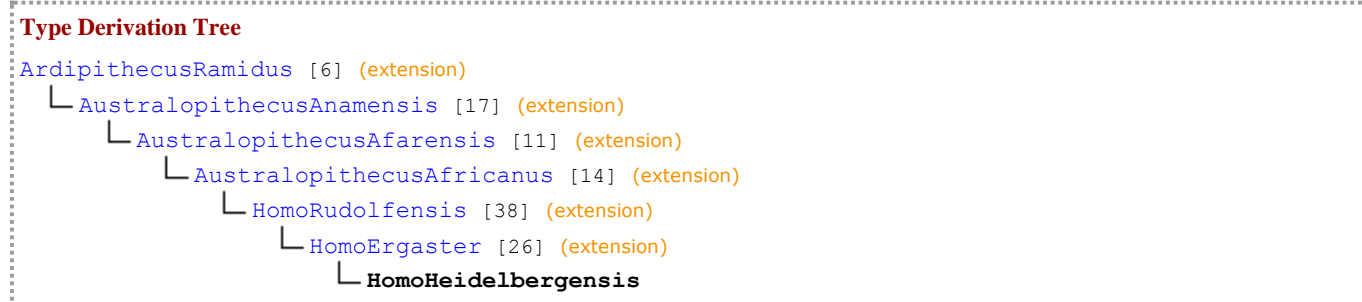
Little is known so far about how this group fitted into the [hominid timeline](#), but it is thought to have possibly evolved into *Homo sapiens* (perhaps with an intermittent species not yet found) and *Homo neanderthalensis*.

<a href="#">Height</a>	Roughly 1.5 metres
<a href="#">Physique</a>	Robust, but "human" skeleton
<a href="#">Cranial Volume</a>	1100 – 1400 cm <sup>3</sup>
<a href="#">Known Date</a>	400,000 – 100,000
<a href="#">Distribution</a>	Africa, Asia and Europe



<u>Skull form</u>	Higher skull; face less protruding
<u>Jaws/Teeth</u>	Simliar to <i>H. erectus</i> , but teeth may be smaller

## Type Definition Detail



## XML Source (w/o annotations (1); see within schema source: p. 55)

```

<xs:complexType name="HomoHeidelbergensis">
  <xs:complexContent>
    <xs:extension base="HomoErgaster"/>
  </xs:complexContent>
</xs:complexType>

```

## Attribute Detail (all declarations; 7/7)

### cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="cranialVolume" type="xs:integer"/>

```

### distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="distribution" type="xs:string"/>

```

### height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="height" type="xs:decimal"/>

```

### knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within *ArdipithecusRamidus* complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within *ArdipithecusRamidus* complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined

**Use:** optional

**Defined:** locally [8] within *ArdipithecusRamidus* complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

# complexType HomoNeandertalensis

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [36]  
**Used:** never

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume   = xs:integer
  knownDate       = xs:gYear
  distribution    = xs:string
  skullForm       = xs:string
/>
```

## Annotation



Neanderthals lived roughly 150,000 to 30,000 years ago and lived in much of [Europe](#), [part of Asia](#), and [the Middle East](#). The first fossils humans to be discovered, Neanderthals have long been the focus of anthropological investigation. More bones of Neanderthals are known than for any other fossil hominine group, including some 30 nearly complete skeletons, so this preoccupation within the anthropological profession is understandable.

Neanderthal anatomy represents a mixture of primitive characters, derived characters that are shared with other hominines, and derived characters that are unique to Neanderthals. In general terms, this species may be described as being robustly built, heavily muscled, and short in stature. Evidence of the heavy musculature appears in the extremely large muscle attachments and the bowing of the long bones. This implies that the species was involved in daily, routine, heavy work.

This species existed in a cold climate, at the end of the Pleistocene Ice Age and this appears in the short forearm and leg relative to the humerus and femur (Allen's rule which implies that in warm-blooded species, the relative size of the limbs decreases as temperature decreases).

The Neanderthal DNA sequence falls outside the variation of modern human DNA. Thus if Neanderthals had contributed to our genome (any interbreeding whatsoever), it would be expected that modern-day individuals would express Neanderthals geno- and phenotypes. A paper published in the Journal *Cell* in 1997 proves that there is no overlap between modern-day [Homo sapiens](#) and [Homo neanderthalensis](#) genes. After a long period of overlap in the same timescale, Neanderthals went extinct in a wave from East to West where the last Neanderthal remains were found in Zafarraya, Spain 27,000 years ago.

<u>Height</u>	1.5 – 1.7 metres
<u>Physique</u>	As <i>H. heidelbergensis</i> , but adapted for cold
<u>Cranial Volume</u>	1200 – 1750 cm <sup>3</sup>
<u>Known Date</u>	150,000 – 30,000
<u>Distribution</u>	Europe and Western Asia
<u>Skull form</u>	Reduced brow ridge; thinner skull; large nose: midface projection
<u>Jaws/Teeth</u>	Simliar to <i>H. heidelbergensis</i> ; teeth smaller except for incisors; chin development in some

## Type Definition Detail

### Type Derivation Tree

```

ArdipithecusRamidus [6] (extension)
├─ AustralopithecusAnamensis [17] (extension)
│   └─ AustralopithecusAfarensis [11] (extension)
│       └─ AustralopithecusAfricanus [14] (extension)
│           └─ HomoRudolfensis [38] (extension)
│               └─ HomoErgaster [26] (extension)
│                   └─ HomoHeidelbergensis [32] (extension)
│                       └─ HomoNeandertalensis

```

### XML Source (w/o annotations (1); see within schema source: p. 57)

```

<xs:complexType name="HomoNeandertalensis">
  <xs:complexContent>
    <xs:extension base="HomoHeidelbergensis"/>
  </xs:complexContent>
</xs:complexType>

```

### Attribute Detail (all declarations; 7/7)

#### cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

#### distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

#### height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

#### knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [8] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

# complexType HomoRudolfensis

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [39]  
**Used:** at 1 [location](#)

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique          = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm        = xs:string
/>
```

## Known Direct Subtypes (1):

[HomoErgaster](#) [26]

## Known Indirect Subtypes (4):

[HomoErectus](#) [23], [HomoHeidelbergensis](#) [32], [HomoNeandertalensis](#) [35], [HomoSapiens](#) [41]

## Known Usage Locations

- In derivations of other global types (1):

[HomoErgaster](#) [26] (as extension base)

## Annotation



In October 1993, an international team of paleontologists discovered a partial hominine mandible near [Lake Malawi](#). The mandible was less robust than that in australopithecines and the cheek teeth smaller, indicating that it was closely associated with *Homo*. The authors named this specimen *Homo rudolfensis*, a contemporary of *Homo habilis* which was found at [Lake Turkana](#). The Malawi hominid, together with other fauna that are characteristic of Eastern Africa, indicate significant fauna movement between the two regions.

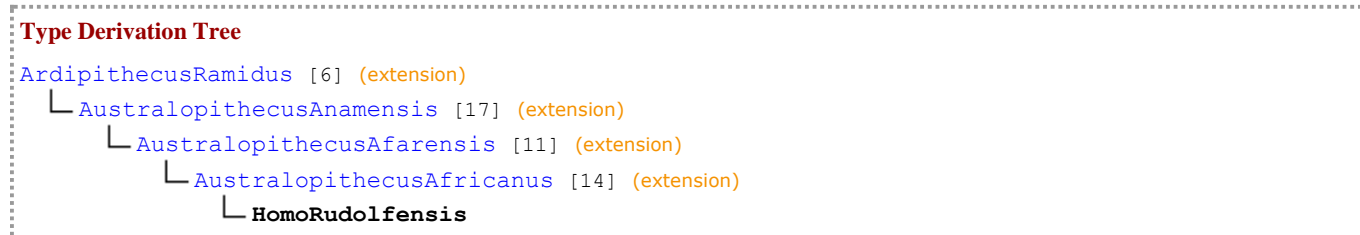
*Homo rudolfensis* had a flatter, broader face and broader postcanine teeth with more complex crowns and roots, and thicker enamel. This species also had a larger cranium. All the non-australopithecine specimens found at Olduvai Gorge are known to be *Homo habilis*, whereas the ones found at Lake Turkana can be divided between *Homo habilis* and *Homo rudolfensis*.

There is now a general agreement that two species of *Homo* coexisted 2 million years ago. Although the taxonomic distinction is based principally on cranial and dental characters, it is useful to think of *Homo habilis* as a smaller-brained creature with an archaic postcranium, and *Homo rudolfensis* as larger-brained with a more modern postcranium. Which of the two (if either) gave rise to later *Homois* still being debated. *Homo rudolfensis* appears to have a good claim based on brain size and the more modern postcranium, but some insist that its facial and dental anatomy disqualify it from this role.

<a href="#">Height</a>	Ca. 1.5 metres
<a href="#">Physique</a>	Robust, but "human" skeleton
<a href="#">Cranial Volume</a>	600 – 800 cm <sup>3</sup>
<a href="#">Known Date</a>	2.4 – 1.6 million years ago

<u>Distribution</u>	Eastern Africa
<u>Skull form</u>	Larger, flatter face
<u>Jaws/Teeth</u>	Robust jaw; large narrow molars

## Type Definition Detail



## XML Source (w/o annotations (1); see within schema source: p. 49)

```

<xs:complexType name="HomoRudolfensis">
  <xs:complexContent>
    <xs:extension base="AustralopithecusAfricanus"/>
  </xs:complexContent>
</xs:complexType>

```

## Attribute Detail (all declarations; 7/7)

cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="cranialVolume" type="xs:integer"/>

```

distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="distribution" type="xs:string"/>

```

height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```

<xs:attribute name="height" type="xs:decimal"/>

```

knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined

**Use:** optional

**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined

**Use:** optional

**Defined:** locally [8] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```



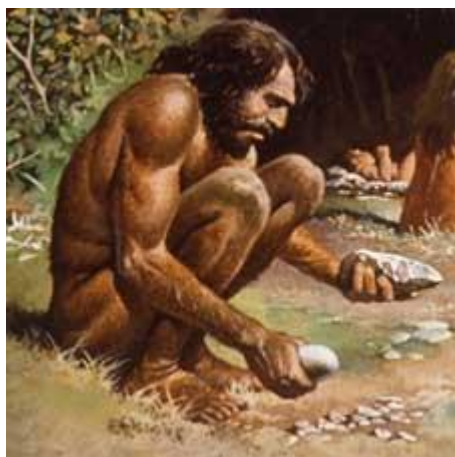
# complexType HomoSapiens

**Namespace:** <http://www.geocities.com/palaeoanthropology>  
**Content:** empty, 7 [attributes](#)  
**Defined:** globally in [HumanEvolution.xsd](#); see [XML source](#) [42]  
**Used:** never

## XML Representation Summary

```
<...
  height           = xs:decimal
  weight           = xs:decimal
  physique         = xs:string
  cranialVolume    = xs:integer
  knownDate        = xs:gYear
  distribution     = xs:string
  skullForm       = xs:string
/>
```

## Annotation



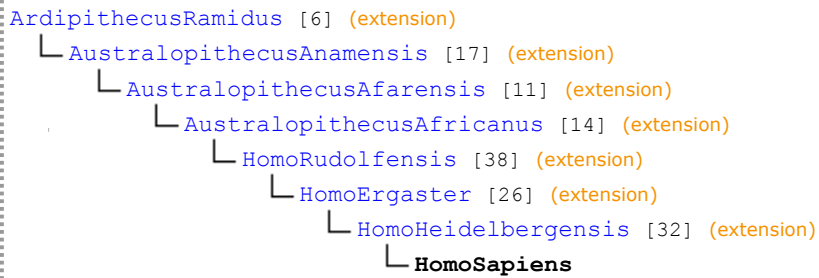
Population movements such as the colonisation of the Americas have occurred many times in human prehistory, and they inevitably muddy what might otherwise be a clear relationship between body shape and climate, and its change through time. One important example relates to the issue of the origin of modern humans. Many anthropologists believe that anatomically modern *Homo sapiens* evolved from a small population in Africa 200,000 years ago, and then spread into the rest of the Old World, reaching western Europe only 35,000 years ago. This is known as the "Out of Africa" hypothesis. However, if this was true, the African origin of anatomically modern humans would be reflected in their body and limb proportions. Indeed, such populations do show this trend, as these tall, long-limbed people entered lands located at a latitude more conducive to wide bodies and short limbs.

It is mostly agreed on the overall anatomical and behavioural shifts that accompanied the evolutionary transformation from *Homo erectus* to *Homo sapiens*. Anatomically, it involved a decrease of skeletal and dental robusticity, modifications of certain functional – particularly locomotor – anatomy, and an increase in cranial volume. Behaviourally, the transition brought more finely crafted and diverse tool technologies, more efficient foraging strategies, more complex social organisation, the full development of spoken language, and artistic expression. However, one point on which an agreement has not yet been reached, is the origin of these **anatomically modern humans**.

<i>Early modern Homo sapiens</i>	
<u>Height</u>	1.6 – 1.85 metres
<u>Physique</u>	Modern skeleton, adapted for warmth
<u>Cranial Volume</u>	1200 – 1750 cm <sup>3</sup>
<u>Known Date</u>	130,000 – 60,000
<u>Distribution</u>	Europe and Western Asia
<u>Skull form</u>	Small or no brow ridge; shorter high skull
<u>Jaws/Teeth</u>	Shorter jaws than <i>Neanderthals</i> ; chin developed; teeth may be smaller

## Type Definition Detail

### Type Derivation Tree



### XML Source (w/o annotations (1); see within schema source: p. 58)

```

<xs:complexType name="HomoSapiens">
  <xs:complexContent>
    <xs:extension base="HomoHeidelbergensis"/>
  </xs:complexContent>
</xs:complexType>

```

### Attribute Detail (all declarations; 7/7)

#### ■ cranialVolume

**Type:** xs:integer, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="cranialVolume" type="xs:integer"/>
```

#### ■ distribution

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="distribution" type="xs:string"/>
```

#### ■ height

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="height" type="xs:decimal"/>
```

#### ■ knownDate

**Type:** xs:gYear, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

[XML Source](#) (see within schema source: p. 44)

```
<xs:attribute name="knownDate" type="xs:gYear"/>
```

■ physique

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="physique" type="xs:string"/>
```

■ skullForm

**Type:** xs:string, predefined  
**Use:** optional  
**Defined:** locally [7] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 45)

```
<xs:attribute name="skullForm" type="xs:string"/>
```

■ weight

**Type:** xs:decimal, predefined  
**Use:** optional  
**Defined:** locally [8] within ArdipithecusRamidus complexType

XML Source (see within schema source: p. 44)

```
<xs:attribute name="weight" type="xs:decimal"/>
```

## Schema XML Source

```

<?xml version="1.0"?>
<xs:schema targetNamespace="http://www.geocities.com/palaeoanthropology"
xmlns="http://www.geocities.com/palaeoanthropology" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:annotation>
    <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
      <font size="-1">
        <i>
          <b>Notice:</b>
          All scientific texts and most of the images presented here were borrowed from the following website:
          <a href="http://www.geocities.com/palaeoanthropology/palaeo.html"
            target="_blank">http://www.geocities.com/palaeoanthropology/</a>
          .
          FILIGRIS WORKS respects and appreciates the work of the site author.
        </i>
      </font>
      <p align="center">
        
        <map name="evolution">
          <area coords="57,12,98,37" href="complexTypes/HomoSapiens.html" shape="rect"/>
          <area coords="131,37,180,75" href="complexTypes/HomoNeandertalensis.html" shape="rect"/>
          <area coords="101,130,150,169" href="complexTypes/HomoHeidelbergensis.html" shape="rect"/>
          <area coords="216,173,290,186" href="complexTypes/HomoErectus.html" shape="rect"/>
          <area coords="42,374,122,387" href="complexTypes/HomoErgaster.html" shape="rect"/>
          <area coords="248,478,316,491" href="complexTypes/HomoHabilis.html" shape="rect"/>
          <area coords="105,490,163,513" href="complexTypes/HomoRudolfensis.html" shape="rect"/>
          <area coords="296,424,386,448" href="complexTypes/AustralopithecusBoisei.html" shape="rect"/>
          <area coords="385,625,474,647" href="complexTypes/AustralopithecusAethiopicus.html" shape="rect"/>
          <area coords="173,666,263,691" href="complexTypes/AustralopithecusAfricanus.html" shape="rect"/>
          <area coords="196,850,286,876" href="complexTypes/AustralopithecusAfarensis.html" shape="rect"/>
          <area coords="240,1015,329,1039" href="complexTypes/AustralopithecusAnamensis.html" shape="rect"/>
          <area coords="305,1107,372,1132" href="complexTypes/ArdipithecusRamidus.html" shape="rect"/>
        </map>
      </p>
    </xs:documentation>
  </xs:annotation>
  <!--~~~~~>
  <!-- Ardipithecus Ramidus -->
  <!--~~~~~>
  <xs:complexType name="ArdipithecusRamidus">
    <xs:annotation>
      <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
        
        <i>Ardipithecus ramidus</i>
        is the earliest hominid found so far and was discovered in
        <a href="https://en.wikipedia.org/wiki/Aramis,_Ethiopia" target="_blank">Aramis</a>
        ,
        in the Middle Awash region of Ethiopia in 1994 by Tim White and his two colleagues,
        Gen Suwa and Berhane Asfaw.
        <i>Ardipithecus ramidus</i>
        translates literally as
        "ground man-root" and is thought to be 4.4 to 4.5 million years old. Originally
        it was named as a member of the Australopithecine family, but it was later decided
        that this species differed too much from other australopithecines.
      </p>
      However, even though the possibility has been raised that
      <i>ramidus</i>
      might even
      be an ape, it is fairly sure that it is a hominid, as the very earliest hominines
      were expected to be apelike (or even possibly chimplike) in many ways such as
      dentition anyway. It has thus been decided that
      <i>Ardipithecus ramidus</i>
      was
      <b>not</b>
      a direct ancestor to later hominids.
      <br clear="left"/>
    </xs:documentation>
  </xs:annotation>
  <xs:attribute name="height" type="xs:decimal"/>
  <xs:attribute name="weight" type="xs:decimal"/>
  <xs:attribute name="physique" type="xs:string"/>
  <xs:attribute name="cranialVolume" type="xs:integer"/>
  <xs:attribute name="knownDate" type="xs:gYear"/>
  <xs:attribute name="distribution" type="xs:string"/>

```

```

<xs:attribute name="skullForm" type="xs:string"/>
</xs:complexType>
<!--~~~~~>
<!-- Australopithecus Anamensis -->
<!--~~~~~>
<xs:complexType name="AustralopithecusAnamensis">
  <xs:annotation>
    <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
      
      This hominine species was discovered in 1994 by
      <a href="http://www.benedictine.edu/mleakey.html" target="_blank">Maeve Leakey</a>
      in
      <a href="https://en.wikipedia.org/wiki/Kanapoi" target="_blank">Kanapoi and Allia Bay</a>
      ,
      situated in North Kenya. It was named
      <i>Australopithecus anamensis</i>
      from "
      <i>anam</i>
      " meaning "lake" in the local Turkana language. The fossils
      (9 from Kanapoi and 12 from Allia Bay) include upper and lower jaws,
      cranial fragments, and the upper and lower parts of a leg bone (tibia).
      In addition to this, the collection includes a fragment of humerus that
      was found 30 years ago at the same site at Kanapoi.
    </p>
    It was found along the East African Rift valley and due to the dating of
    this hominine species,
    <i>Australopithecus anamensis</i>
    could possibly
    be an ancestor to "Lucy" and counterparts.
    <br clear="left"/>
  </xs:documentation>
</xs:annotation>
<xs:complexContent>
  <xs:extension base="ArdipithecusRamidus"/>
</xs:complexContent>
</xs:complexType>
<!--~~~~~>
<!-- Australopithecus Afarensis -->
<!--~~~~~>
<xs:complexType name="AustralopithecusAfarensis">
  <xs:annotation>
    <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
      
      Until recently, the earliest known hominine for which sufficient diagnostic
      anatomical evidence was available was
      <i>Australopithecus afarensis</i>
      ,
      fossils of which have been found in
      <a href="https://en.wikipedia.org/wiki/East_Africa" target="_blank">Ethiopia, Tanzania, and Kenya</a>
      ,
      and most of which date between 2.9 and 3.9 million years.
      New finds of fossils as old or older than
      <i>A. afarensis</i>
      have been made in Ethiopia, Kenya, and Chad. These specimens,
      which are sufficiently different from
      <i>A. afarensis</i>
      to have been named a new species, include the following:
      <a href="https://en.wikipedia.org/wiki/Ardipithecus#Ardipithecus_ramidus" target="_blank">
        <i>Ardipithecus ramidus</i>
      </a>
      from Ethiopia, dated at 4.4 million years;
      <a href="https://en.wikipedia.org/wiki/Australopithecus_anamensis" target="_blank">
        <i>Australopithecus anamensis</i>
      </a>
      from Kenya, with an age range of 4.2 to 3.9 million years; and
      <i>Australopithecus bahrelghazali</i>
      from Chad, with an age estimate of 3 to 3.5 million years.
    </p>
    The first
    <i>afarensis</i>
    fossils were found in the mid 1970s.
    Their initial interpretation was controversial and remains so today,
    albeit to a lesser degree. While many anthropologists accept that
    the multitude of fossil specimens that have been attributed to
    <i>afarensis</i>
    do indeed represent a single, sexually dimorphic species, others believe
    that the fossils belong to two, and perhaps more, species. For a long time
    <i>afarensis</i>
  </xs:documentation>
</xs:annotation>

```

was assumed to have represented the founding species of the hominine clade and the ancestor of all later species.

```

<p/>
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    <td>
      <u>Height</u>
    </td>
    <td>1.0 &#8211; 1.5 metres</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Weight</u>
    </td>
    <td>30 &#8211; 70 kg</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Cranial Volume</u>
    </td>
    <td>400 &#8211; 500 cm&#179;</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Known Date</u>
    </td>
    <td>4.0 &#8211; 2.5 million years ago</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Distribution</u>
    </td>
    <td>Eastern Africa</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Physique</u>
    </td>
    <td>Light build; some ape-like features</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Skull form</u>
    </td>
    <td>
      Low, flat forehead; projecting face; prominent brow ridges
    </td>
  </tr>
  <tr valign="top">
    <td>
      <u>Jaws/Teeth</u>
    </td>
    <td>
      Relatively large incisors and canines; gap between upper incisors and canines; moderate-sized molars
    </td>
  </tr>
  <tr valign="top">
    <td>
      <u>Sexual Dimorphism</u>
    </td>
    <td>Marked to moderate</td>
  </tr>
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```

In 1985, a cranium was found by Alan Walker at the west side of [Lake Turkana](https://en.wikipedia.org/wiki/Lake_Turkana) in Northern Kenya and was named *Australopithecus aethiopicus*

The cranium was as robust as any yet known, but was 2.5 million years old. Clearly, the huge molars, flared cheek bones, and dished face could not be the end-product of an evolutionary line if it were present at the origin of that supposed line. How this discovery affects the shape of the hominid family tree remains under discussion today.

```

</xs:documentation>
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```

```

<!--~~~~~>
<!-- Australopithecus Boisei -->
<!--~~~~~>

```

```

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```

In 1959, [Mary Leakey](http://www.talkorigins.org/faqs/homs/mleakey.html) made the first hominid discovery in East Africa at the [Olduvai Gorge](https://en.wikipedia.org/wiki/Olduvai_Gorge) in Tanzania which resembled the robust australopithecines already found in South Africa. After reconstructing the skull which was built up out of hundreds of fragments, it was found that this specimen was even more "robust" than its southern relatives. At first, it was named *Zinjanthropus boisei*, but later changed to *Australopithecus boisei*

There is still however a lively debate over the genus name and this species is also often referred to as *Paranthropus boisei*

A common perception is that the robust species of australopithecine differs sufficiently from the gracile type to warrant a different genus name.

```

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  <tr valign="top">
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    <td>1.2 &#8211; 1.4 metres</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Weight</u>
    </td>
    <td>40 &#8211; 80 kg</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Cranial Volume</u>
    </td>
    <td>410 &#8211; 530 cm&#179;</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Known Date</u>
    </td>
    <td>2.6 &#8211; 1.2 million years ago</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Distribution</u>
    </td>
    <td>Eastern Africa</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Physique</u>

```

```

        </td>
        <td>Very heavy build; relatively long arms</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Skull form</u>
        </td>
        <td>
            Prominent crests on top and back of skull; very long, broad, flattish face; strong facial buttressing
        </td>
    </tr>
    <tr valign="top">
        <td>
            <u>Jaws/Teeth</u>
        </td>
        <td>
            Very thick jaws; small incisors and canines; large, molar-like premolars; very large molars
        </td>
    </tr>
    <tr valign="top">
        <td>
            <u>Sexual Dimorphism</u>
        </td>
        <td>Marked sexual dimorphism</td>
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            An Australian anatomist at the University of the Witwatersrand,
            Johannesburg, South Africa, named
            <a href="http://www.talkorigins.org/faqs/homs/rdart.html" target="_blank">Raymond Dart</a>
            ,
            discovered the first australopithecine in November 1924 and published his
            interpretation of it in the journal
            <i>Nature</i>
            in February 1925. The fossil
            was that of an immature apelike individual and was found at a lime quarry at
            <a href="https://en.wikipedia.org/wiki/Taung" target="_blank">Taung</a>
            ,
            southwest of Johannesburg. The fossil existed of the face, part of the cranium,
            the complete lower jaw and a brain endocast, formed when sand inside the skull
            hardened to rock, recording the shape of the brain.
        </p>
        In the
        <i>Nature</i>
        paper published by Dart, he stated that the Taung individual
        was an earlier form of human, and named it
        <i>Australopithecus africanus</i>
        ("southern ape from Africa"). When a Scottish paleontologist named Robert Broom,
        joined in the search for early hominid fossils with Dart, they soon discovered
        other examples of australopithecine.
        <i>Australopithecus africanus</i>
        appeared
        to be apelike in having a protruding face and small brain, but had distinctly
        unapelike dentition, including small canines and large, flat molars.
        A bipedal posture was again indicated by the central position of the foramen
        magnum, and by the anatomy of the spine, pelvis, and femur.
        </p>
        <table border="1" cellpadding="4" cellspacing="2" width="100%">
            <tr valign="top">
                <td>
                    <u>Height</u>
                </td>
                <td>1.1 &#8211; 1.4 metres</td>
            </tr>
        </table>
    </xs:annotation>

```



```

        <td>
            <u>Weight</u>
        </td>
        <td>30 &#8211; 60 kg</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Cranial Volume</u>
        </td>
        <td>400 &#8211; 500 cm&#179;</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Known Date</u>
        </td>
        <td>3.0 &#8211; 2.5 million years ago</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Distribution</u>
        </td>
        <td>Southern Africa</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Physique</u>
        </td>
        <td>
            Light build; probably relatively long arms; more "human" features
        </td>
    </tr>
    <tr valign="top">
        <td>
            <u>Skull form</u>
        </td>
        <td>
            Higher forehead; shorter face; brow ridges less prominent
        </td>
    </tr>
    <tr valign="top">
        <td>
            <u>Jaws/Teeth</u>
        </td>
        <td>
            Small incisor-like canines; no gap between upper incisors and canines; larger molars
        </td>
    </tr>
    <tr valign="top">
        <td>
            <u>Sexual Dimorphism</u>
        </td>
        <td>
            Probably less than
            <i>A. afarensis</i>
        </td>
    </tr>
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<!-- Homo Rudolfensis -->
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            In October 1993, an international team of paleontologists discovered a partial hominine mandible near
            <a href="https://en.wikipedia.org/wiki/Lake_Malawi" target="_blank">Lake Malawi</a>
            .
            The mandible was less robust than that in australopithecines and the cheek teeth smaller,
            indicating that it was closely associated with
        </xs:documentation>
    </xs:annotation>

```

```

<i>Homo</i>
.
The authors named this specimen
<i>Homo rudolfensis</i>
, a contemporary of
<a href="https://en.wikipedia.org/wiki/Homo_habilis" target="_blank">
  <i>Homo habilis</i>
</a>
which was found at
<a href="https://en.wikipedia.org/wiki/Lake_Turkana" target="_blank">Lake Turkana</a>
.
The Malawi hominid, together with other fauna that are characteristic of Eastern Africa,
indicate significant fauna movement between the two regions.
<p/>
<i>Homo rudolfensis</i>
had a flatter, broader face and broader postcanine teeth with more complex
crowns and roots, and thicker enamel. This species also had a larger cranium.
All the non-australopithecine specimens found at Olduvai Gorge are known to be
<i>Homo habilis</i>
, whereas the ones found at Lake Turkana can be divided between
<i>Homo habilis</i>
and
<i>Homo rudolfensis.</i>
<p/>
There is now a general agreement that two species of
<i>Homo</i>
coexisted 2 million years ago. Although the taxonomic distinction is based
principally on cranial and dental characters, it is useful to think of
<i>Homo habilis</i>
as a smaller-brained creature with an archaic postcranium, and
<i>Homo rudolfensis</i>
as larger-brained with a more modern postcranium. Which of the two (if either)
gave rise to later
<i>Homo</i>
is still being debated.
<i>Homo rudolfensis</i>
appears to have a good claim based on brain size and the more modern postcranium,
but some insist that its facial and dental anatomy disqualify it from this role.
<p/>
<table border="1" cellpadding="4" cellspacing="2" width="100%">
  <tr valign="top">
    <td>
      <u>Height</u>
    </td>
    <td>Ca. 1.5 metres</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Physique</u>
    </td>
    <td>Robust, but "human" skeleton</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Cranial Volume</u>
    </td>
    <td>600 &#8211; 800 cm&#179;</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Known Date</u>
    </td>
    <td>2.4 &#8211; 1.6 million years ago</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Distribution</u>
    </td>
    <td>Eastern Africa</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Skull form</u>
    </td>
    <td>Larger, flatter face</td>
  </tr>
  <tr valign="top">

```

```

        <td>
            <u>Jaws/Teeth</u>
        </td>
        <td>Robust jaw; large narrow molars</td>
    </tr>
</table>
</xs:documentation>
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<!-- Homo Habilis -->
<!--~~~~~>
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            The early discoveries of early hominid fossils were made at
            <a href="https://en.wikipedia.org/wiki/Olduvai_Gorge" target="_blank">Olduvai Gorge</a>
            ,
            by the
            <a href="http://www.leakeyfoundation.org/" target="_blank">Leakeys</a>
            . Not long after
            <a href="http://www.talkorigins.org/faqs/homs/mleakey.html" target="_blank">Mary Leakey</a>
            had found
            <a href="https://en.wikipedia.org/wiki/Paranthropus_boisei" target="_blank">
                <i>Australopithecus boisei</i>
            </a>
            ,
            <a href="http://www.talkorigins.org/faqs/homs/lleakey.html" target="_blank">Louis Leakey</a>
            found fossils which he thought were the makers of the stone tools found in the gorge.
            At first he had attributed
            <i>Australopithecus boisei</i>
            with the stone artifacts discovered in the gorge, but when the hominid fossils
            were finally found, he immediately realised that this was not the case.
        </p>
        The fossils were thought to be slightly older than
        <i>Australopithecus boisei</i>
        (about 1.75 million years) and in addition, the teeth were smaller and the brain
        was calculated to be significantly larger. Louis Leakey became convinced that these
        fossils were in fact the ancestors of modern humans. It was determined that
        <i>Homo habilis</i>
        (as the fossils were named) overlapped with the robust australopithecines
        for roughly 1 million years.
        <i>Homo habilis</i>
        means "handy man" and was suggested to them by Raymond Dart.
        </p>
        A series of anatomical characters is to be found uniquely in
        <i>Homo</i>
        &#8211; for example, an increase in cranial vault height and thickness, reduced lower
        facial prognathism, and reduction in the size of premolars and molars and the length
        of the molar row &#8211; but what has always stood out the most is brain size.
        </p>
        <table border="1" cellpadding="4" cellspacing="2" width="100%">
            <tr valign="top">
                <td>
                    <u>Height</u>
                </td>
                <td>1.0 metres</td>
            </tr>
            <tr valign="top">
                <td>
                    <u>Physique</u>
                </td>
                <td>Relatively long arms</td>
            </tr>
            <tr valign="top">
                <td>
                    <u>Cranial Volume</u>
                </td>
                <td>500 &#8211; 650 cm&#179;</td>
            </tr>
            <tr valign="top">
                <td>
                    <u>Known Date</u>
                </td>
                <td>
            </tr>
        </table>
    </xs:documentation>
    </xs:annotation>
</xs:complexType>

```

```

        </td>
        <td>2.0 &#8211; 1.6 million years ago</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Distribution</u>
        </td>
        <td>Eastern (+Southern?) Africa</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Skull form</u>
        </td>
        <td>Relatively small face; nose developed</td>
    </tr>
    <tr valign="top">
        <td>
            <u>Jaws/Teeth</u>
        </td>
        <td>Thinner jaw; smaller, narrow molars</td>
    </tr>
</table>
</xs:documentation>
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<!-- Homo Ergaster -->
<!--~~~~~>
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            One of the most famous finds at
            <a href="https://en.wikipedia.org/wiki/Lake_Turkana" target="_blank">Lake Turkana, Northern Kenya</a>
            is the cranium of an early species of
            <i>Homo</i>
            , known as
            <a href="https://en.wikipedia.org/wiki/Paranthropus_boisei" target="_blank">
                <i>Australopithecus boisei</i>
            </a>
            .
            However, in the same sedimentary layer, another cranium was also found belonging
            to a species of hominid named
            <i>Homo ergaster</i>
            .
            This hominid species is believed to be a different geographical population of
            <a href="https://en.wikipedia.org/wiki/Homo_erectus" target="_blank">
                <i>Homo erectus</i>
            </a>
            .
            <p/>
            Many aspects of
            <i>Homo ergaster</i>
            and
            <a href="https://en.wikipedia.org/wiki/Homo_erectus" target="_blank">
                <i>Homo erectus</i>
            </a>
            anatomy are, of course, similar, with the principal differences being a higher cranial
            vault, thinner cranial bone, absence of sagittal keel, and certain cranial base
            characteristics in
            <i>Homo ergaster</i>
            .
            One distinguishing feature between early
            <i>Homo</i>
            and
            <i>ergaster</i>
            /
            <i>erectus</i>
            involves increased brain size (ranging between 850 and 1100 cm&#179;,
            with an increase over time), although the increase in body size actually
            means that the relative brain size has increased but little.
            <p/>
            Other distinguishing features include a long, low cranium (particularly in

```

*Homo erectus*
),
the presence of brow ridges, a shortened face, and a projecting nasal aperture, suggesting the first appearance of the typical human external nose with the nostrils facing downward. The structure of the nose would permit the condensation of moisture from exhaled air, which would have proved beneficial in a species that pursued an active subsistence strategy in warm, arid habitats, such as those occupied by early
*Homo ergaster*
.

**Early**
*Homo*
gave rise to a large-bodied, large-brained species in Africa approximately 2 million years ago, but this species is now called
*Homo ergaster*
by many anthropologists.
*Homo ergaster*
expanded its range beyond Africa and into Asia soon after its origin and at least by 1.8 million years ago; it then gave rise to
*Homo erectus*
in those areas.
[\*Homo erectus\*](https://en.wikipedia.org/wiki/Homo_erectus)
expanded its range throughout Asia, back into Africa, and presumably into Europe. Approximately 150,000 years ago, a speciation event in Africa gave rise to
[\*Homo sapiens\*](https://en.wikipedia.org/wiki/Homo_sapiens)
(probably from
*Homo ergaster*
, but possibly from
*Homo erectus*
),
which then spread into the rest of the Old World, and subsequently into Australia and the Americas.

<u>Height</u>	1.3 &#8211; 1.7 metres
<u>Physique</u>	Robust, but "human" skeleton
<u>Cranial Volume</u>	750 &#8211; 1250 cm <sup>3</sup>
<u>Known Date</u>	1.8 &#8211; 1.2 million years ago
<u>Distribution</u>	Africa into Asia
<u>Skull form</u>	Higher cranial vault, thinner cranial bone, absence of sagittal keel and certain cranial base characteristics

```

        <u>Jaws/Teeth</u>
    </td>
    <td>
        Robust jaw in larger individuals; smaller teeth than
        <i>H. habilis</i>
    </td>
</tr>
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<!--~~~~~>
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            The first findings of
            <i>Homo erectus</i>
            fossils were made in the late 19th and early 20th century in
            <a href="http://humanorigins.si.edu/evidence/human-fossils/species/homo-erectus" target="_blank">Indonesia and
            China</a>
            .
            At first, these findings were not recognised as early hominids, but with later studies
            it was finally accepted that
            <i>Homo erectus</i>
            was a widespread early human species.
            <p/>
            Since the 1950s, discoveries of
            <i>Homo erectus</i>
            fossils have been made sporadically, principally in
            <a href="http://humanorigins.si.edu/evidence/human-fossils/species/homo-erectus" target="_blank">Africa, but
            also in Asia</a>
            .
            The first of these discoveries took place in Algeria, where three jaws, a cranial bone,
            and some teeth were found. Several specimens of
            <i>Homo erectus</i>
            were also found at
            <a href="https://en.wikipedia.org/wiki/Olduvai_Gorge" target="_blank">Olduvai Gorge</a>
            ,
            in East Africa, including a rather robustly built, large-brained cranium.
            Findings were also made in South Africa.
            <p/>
            However, the richest source of fossils has been the Lake Turkana region of
            northern Kenya, both on the east and west sides. These sites have exposed
            the oldest and most complete specimens. In 1975, an almost complete cranium
            was found and then dated at 1.8 million years with a brain size of 880 cm3;
            .
            A decade later, they found the now famous "Turkana Boy" which is renowned
            for its almost complete skeleton. This skeleton was a huge aid in assessing
            overall body proportions and relationships of the species. This boy stood more
            than 5 feet tall when he died, and would have exceeded 6 feet 2;
            had he lived to maturity. His cranial capacity was 880 cm3; and his
            body stature (tall, thin, long arms and legs) are typical of humans adapted
            to open, tropical environments.
            <p/>
            Two different hypotheses exist stating where
            <i>Homo erectus</i>
            first arose. The first model is called
            <a href="https://en.wikipedia.org/wiki/Multiregional_origin_of_modern_humans" target="_blank">The Multiregional
            Evolution Model</a>
            and used to be by far the most popular until recent genetic evidence was brought
            to light by a scientist at the University of California at Berkeley called
            Allan Wilson. This model believes that roughly 1 million years ago,
            <i>Homo erectus</i>
            expanded its range beyond Africa, first into Asia and then into Europe,
            developing geographically variable populations.
            <i>Homo erectus</i>
            then became the direct ancestor of
            <i>Homo sapiens</i>
            by a gradual worldwide (excluding the Americas and Australia) evolutionary
            transformation of all populations of
            <i>Homo erectus</i>
            .
            <p/>
            The second hypothesis is referred to as the

```

```

<a href="https://en.wikipedia.org/wiki/Recent_African_origin_of_modern_humans" target="_blank">"Out of Africa
Model"</a>
and believes that that it was not a gradual worldwide change that led
to the evolutionary transformation of populations of
<i>Homo erectus</i>
,
but a speciation event in a single population in Africa, which then spread
throughout the Old World and replaced established populations. This hypothesis
was brought forward by Allan Wilson who in 1987 proved with genetic evidence
that all modern humans evolved from a single female who lived in Africa
approximately 200,000 years ago.
This is also known as the "Mitochondrial Eve Hypothesis".
</p>
<table border="1" cellpadding="4" cellspacing="2" width="100%">
  <tr valign="top">
    <td>
      <u>Height</u>
    </td>
    <td>1.3 &#8211; 1.7 metres</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Physique</u>
    </td>
    <td>Robust, but "human" skeleton</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Cranial Volume</u>
    </td>
    <td>750 &#8211; 1250 cm&#179;</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Known Date</u>
    </td>
    <td>1.8 &#8211; 0.1 million years ago</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Distribution</u>
    </td>
    <td>Africa, Asia and Indonesia (and Europe?)</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Skull form</u>
    </td>
    <td>
      Flat, thick skull with large occipital and brow ridge
    </td>
  </tr>
  <tr valign="top">
    <td>
      <u>Jaws/Teeth</u>
    </td>
    <td>
      Robust jaw in larger individuals; smaller teeth than
      <i>H. habilis</i>
    </td>
  </tr>
</table>
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<!-- Homo Heidelbergensis -->
<!--~~~~~>
<xs:complexType name="HomoHeidelbergensis">
  <xs:annotation>
    <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
      
      This species is often also referred to as "Archaic

```

```

<i>Homo Sapiens</i>
".
Many examples of so-called Archaic
<i>Homo sapiens</i>
have been located, including some recent spectacular finds at
<a href="https://en.wikipedia.org/wiki/Atapuerca_Mountains" target="_blank">Atapuerca</a>
,
in North East Spain. These remains of many individuals include some
that may be 780,000 years old. According to some proponents of the
"
<a href="https://en.wikipedia.org/wiki/Recent_African_origin_of_modern_humans" target="_blank">Out of
Africa</a>
"
hypothesis, most of these specimens should be assigned to
<i>Homo heidelbergensis</i>
,
which may have been ancestral to Neanderthals in Europe and to
<a href="https://en.wikipedia.org/wiki/Homo_sapiens" target="_blank">
  <i>Homo sapiens</i>
</a>
in Africa. However, in May 1997, the discoverers of the fossils elected
to name the fossils a new species,
<i>Homo antecessor</i>
.
<a href="https://en.wikipedia.org/wiki/Multiregional_origin_of_modern_humans"
target="_blank">Multiregionalists</a>
view this group as evidence of a transition toward modern
<i>Homo sapiens</i>
.
<p/>
The "Mauer mandible", found in 1907 and dated at roughly 500,000 years old,
combines primitive features (robusticity) with modern features (molar size),
was given the species name
<i>Homo heidelbergensis</i>
in 1908. Some major findings of this species may be located at
<a href="https://en.wikipedia.org/wiki/Atapuerca_Mountains" target="_blank">Atapuerca</a>
in Northern Spain where one of the most spectacular finds of recent times was made.
They uncovered 1300 human fossils remains (representing 30 individuals)
dated at 300,000 years old. These specimens also display modern and ancient
features mixed, and can probably be assigned to
<i>Homo heidelbergensis</i>
.
<p/>
The main noticeable features of the fossils is the more prominent face
and nose and the changes at the base of the skull which are perhaps thought
to be associated with changes in the voice box.
<p/>
Little is known so far about how this group fitted into the
<a href="https://en.wikipedia.org/wiki/Timeline_of_human_evolution" target="_blank">hominid timeline</a>
,
but it is thought to have possibly evolved into
<i>Homo sapiens</i>
(perhaps with an intermittent species not yet found) and
<i>Homo neanderthalensis</i>
.
<p/>
<table border="1" cellpadding="4" cellspacing="2" width="100%">
  <tr valign="top">
    <td>
      <u>Height</u>
    </td>
    <td>Roughly 1.5 metres</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Physique</u>
    </td>
    <td>Robust, but "human" skeleton</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Cranial Volume</u>
    </td>
    <td>1100 &#8211; 1400 cm&#179;</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Known Date</u>
    </td>
    <td></td>
  </tr>
</table>

```



```

    </td>
    <td>400,000 &#8211; 100,000</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Distribution</u>
    </td>
    <td>Africa, Asia and Europe</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Skull form</u>
    </td>
    <td>Higher skull; face less protruding</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Jaws/Teeth</u>
    </td>
    <td>
      Similiar to
      <i>H. erectus</i>
      , but teeth may be smaller
    </td>
  </tr>
</table>
</xs:documentation>
</xs:annotation>
<xs:complexType>
  <xs:extension base="HomoErgaster"/>
</xs:complexType>
</xs:complexType>
<!--~~~~~>
<!-- Homo Neandertalensis -->
<!--~~~~~>
<xs:complexType name="HomoNeandertalensis">
  <xs:annotation>
    <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
      
      Neanderthals lived roughly 150,000 to 30,000 years ago and lived in much of
      <a href="http://humanorigins.si.edu/evidence/human-fossils/species/homo-neanderthalensis"
      target="_blank">Europe, part of Asia, and the Middle East</a>
      .
      <p>
        The first fossils humans to be discovered, Neanderthals have long been the focus
        of anthropological investigation. More bones of Neanderthals are known than
        for any other fossil hominine group, including some 30 nearly complete skeletons,
        so this preoccupation within the anthropological profession is understandable.
      </p>
      Neanderthal anatomy represents a mixture of primitive characters, derived
      characters that are shared with other hominines, and derived characters that
      are unique to Neanderthals. In general terms, this species may be described
      as being robustly built, heavily muscled, and short in stature. Evidence of
      the heavy musculature appears in the extremely large muscle attachments and
      the bowing of the long bones. This implies that the species was involved
      in daily, routine, heavy work.
      </p>
      This species existed in a cold climate, at the end of the Pleistocene Ice Age
      and this appears in the short forearm and leg relative to the humerus and femur
      (Allen's rule which implies that in warm-blooded species, the relative size
      of the limbs decreases as temperature decreases).
      </p>
      The Neanderthal DNA sequence falls
      <u>outside</u>
      the variation of modern
      human DNA. Thus if Neanderthals had contributed to our genome (any interbreeding
      whatsoever), it would be expected that modern-day individuals would express
      Neanderthals geno- and phenotypes. A paper published in the Journal
      <i>Cell</i>
      in 1997 proves that there is no overlap between modern-day
      <a href="https://en.wikipedia.org/wiki/Homo_sapiens" target="_blank">
        <i>Homo sapiens</i>
      </a>
      and
      <i>Homo neanderthalensis</i>
      genes. After a long period of overlap in the same timescale, Neanderthals went
      extinct in a wave from East to West where the last Neanderthal remains were
      found in Zafarraya, Spain 27,000 years ago.
      </p>
    </xs:documentation>
  </xs:annotation>
</xs:complexType>

```

```

<table border="1" cellpadding="4" cellspacing="2" width="100%">
  <tr valign="top">
    <td>
      <u>Height</u>
    </td>
    <td>1.5 &#8211; 1.7 metres</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Physique</u>
    </td>
    <td>
      As
      <i>H. heidelbergensis</i>
      , but adapted for cold
    </td>
  </tr>
  <tr valign="top">
    <td>
      <u>Cranial Volume</u>
    </td>
    <td>1200 &#8211; 1750 cm&#179;</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Known Date</u>
    </td>
    <td>150,000 &#8211; 30,000</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Distribution</u>
    </td>
    <td>Europe and Western Asia</td>
  </tr>
  <tr valign="top">
    <td>
      <u>Skull form</u>
    </td>
    <td>
      Reduced brow ridge; thinner skull; large nose: midface projection
    </td>
  </tr>
  <tr valign="top">
    <td>
      <u>Jaws/Teeth</u>
    </td>
    <td>
      Similiar to
      <i>H. heidelbergensis</i>
      ; teeth smaller except for incisors; chin development in some
    </td>
  </tr>
</table>
</xs:documentation>
</xs:annotation>
<xs:complexType>
  <xs:extension base="HomoHeidelbergensis"/>
</xs:complexType>
<!--~~~~~>
<!-- Homo Sapiens -->
<!--~~~~~>
<xs:complexType name="HomoSapiens">
  <xs:annotation>
    <xs:documentation xmlns="http://www.w3.org/1999/xhtml">
      
      Population movements such as the colonisation of the Americas have occurred
      many times in human prehistory, and they inevitably muddy what might otherwise
      be a clear relationship between body shape and climate, and its change through
      time. One important example relates to the issue of the origin of modern humans.
      Many anthropologists believe that anatomically modern
      <i>Homo sapiens</i>
      evolved from a small population in Africa 200,000 years ago, and then spread
      into the rest of the Old World, reaching western Europe only 35,000 years ago.
    </xs:documentation>
  </xs:annotation>
</xs:complexType>

```

This is known as the

"

[Out of Africa](https://en.wikipedia.org/wiki/Recent_African_origin_of_modern_humans)

"

hypothesis. However, if this was true, the African origin of anatomically modern humans would be reflected in their body and limb proportions. Indeed, such populations do show this trend, as these tall, long-limbed people entered lands located at a latitude more conducive to wide bodies and short limbs.

<p/>

It is mostly agreed on the overall anatomical and behavioural shifts that accompanied the evolutionary transformation from

[<i>Homo erectus</i>](http://humanorigins.si.edu/evidence/human-fossils/species/homo-erectus)

</a>

to

*Homo sapiens*

.

Anatomically, it involved a decrease of skeletal and dental robusticity, modifications of certain functional anatomy, particularly locomotor anatomy, and an increase in cranial volume. Behaviourally, the transition brought more finely crafted and diverse tool technologies, more efficient foraging strategies, more complex social organisation, the full development of spoken language, and artistic expression. However, one point on which an agreement has not yet been reached, is the origin of these

**anatomically modern humans**

.

<p/>

|
 <i>Early modern Homo sapiens</i> | || <u>Height</u> | <td>1.6 &#8211; 1.85 metres</td> |
<u>Physique</u>	<td>Modern skeleton, adapted for warmth</td>
<u>Cranial Volume</u>	<td>1200 &#8211; 1750 cm<sup>3</sup></td>
<u>Known Date</u>	<td>130,000 &#8211; 60,000</td>
<u>Distribution</u>	<td>Europe and Western Asia</td>
<u>Skull form</u>	<td>Small or no brow ridge; shorter high skull</td>
<u>Jaws/Teeth</u>	<td>Shorter jaws than

```
<i>Neanderthals</i>
; chin developed; teeth may be smaller
</td>
</tr>
</table>
</xs:documentation>
</xs:annotation>
<xs:complexContent>
  <xs:extension base="HomoHeidelbergensis"/>
</xs:complexContent>
</xs:complexType>
</xs:schema>
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